

SUPPORT FOR THE AMENDMENTS

Claims 10 and 15 have been amended.

The amendment of Claims 10 and 15 serves to remove duplicate claims and is supported by original Claims 1-4, the specification at pages 3-9, and the Examples.

No new matter has been added by the present amendment.

REMARKS

Claims 1-15 are pending in the present application.

The rejection of Claims 1-15 under 35 U.S.C. §103(a) over Hwang et al in view of Abe et al, Ishii et al, and Murao et al is respectfully traversed.

Hwang et al disclose a method for producing an acrylamide polymer using a nitrile hydratase. However, Hwang et al do not disclose or suggest the content of oxazole and hydrogen cyanide in the acrylonitrile starting material. At page 3, lines 3-4 of the Office Action mailed July 18, 2007, the Examiner acknowledges this deficiency in the disclosure of Hwang et al.

With respect to Murao et al, although this reference discloses an enzymatic process of acrylonitrile conversion to acrylamide in the presence of microbial cells containing a nitrile hydratase, at no point does this reference disclose the polymerization of acrylamide monomers prepared by hydrating acrylonitrile by using a nitrile hydratase. Further, as with Hwang et al, Murao et al do not disclose or suggest the content of oxazole and hydrogen cyanide in the acrylonitrile starting material.

To compensate for the foregoing deficiency in Hwang et al and Murao et al with respect to the content of oxazole and hydrogen cyanide, the Examiner cites two references: Ishii et al and Abe et al.

Ishii et al is cited as disclosing the desirability to reduce the concentration of hydrogen cyanide to a concentration of less than or equal to 1.0 mg/kg (i.e., 1 ppm) when using an enzymatic catalyst for the conversion of acrylonitrile to acrylamide.

Abe et al is cited as allegedly disclosing the reduction of oxazole concentration in a method of preparing acrylamide from acrylonitrile. However, notably the method disclosed

by Abe et al is not an enzymatic process but rather catalytic hydration with water in the presence of a copper-based catalyst (see document throughout, for example, at column 1, lines 6-8 and the Examples). Accordingly, Applicants submit that the method disclosed by Abe et al is substantially distinct from that disclosed by Hwang et al, Ishii et al, and Murao et al, as well as the present invention. As such, there would be no reason to combine the disclosure of Abe et al with any of Hwang et al, Ishii et al, and Murao et al much less infer similar results.

Indeed, the Examiner cites column 2, line 20 and alleges that Abe et al disclose that “acrylamide, which has been synthesized by subjecting the acrylonitrile to hydration has higher stability and when polymerized, provides an aqueous solution of higher viscosity compared with acrylamide synthesized likewise from oxazole-containing acrylonitrile”. However, this allegation does not accurately reflect the disclosure of Abe et al at column 2, lines 17-33, which states:

According to Japanese Patent Laid-Open No. 118305/1988 (corresponding to U.S. Pat. No. 4,177,210), for example, acrylonitrile as a raw material is brought into contact with an H-type cation exchange resin to lower the content of oxazole to 200 ppm or less, more preferably to 25 ppm or less in the acrylonitrile. This publication also discloses that acrylamide, which has been synthesized by subjecting the acrylonitrile to hydration *in the presence of a copper-base catalyst*, has higher stability and when polymerized, provides an aqueous solution of higher viscosity compared with acrylamide synthesized likewise from oxazole-containing acrylonitrile. It is also disclosed that as a method for the regeneration of the cation exchange resin, the cation exchange resin is brought into contact with hot water, water vapor, methanol, a slightly-acidic aqueous solution or a mixture thereof. (*emphasis added*)

From the foregoing, it is clear that the disclosure by Abe et al is specific to hydration in the presence of a copper-based catalyst. As such, there is no reasonable basis to extend this statement to enzymatic catalyzed hydration.

Moreover, Applicants remind the Examiner that MPEP §2142 states: “To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation... to modify the reference... Second, there must be a reasonable expectation of success. Finally, the prior art reference... must teach or suggest all the claim limitations.” It is beyond question that none of Hwang et al, Abe et al, Ishii et al, and Murao et al disclose or suggest a motivation modify the process disclosed by Hwang et al to control the content of the oxazole and the hydrogen cyanide as in the presently claimed invention.

Moreover, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination (MPEP §2143.01). Applicants submit that none of Hwang et al, Abe et al, Ishii et al, and Murao et al provides the requisite desirability of the combination. As such, Applicants respectfully request that the Examiner not use the present application as a guidepost to reconstruct the present invention from the disparate teachings of the art of record.

At best, the combined disclosures of Hwang et al, Abe et al, Ishii et al, and Murao et al could be taken as an “invitation to experiment” or could be viewed as making it “obvious to try” to arrive at the present invention. However, “obvious to try” has long been held *not* to constitute obviousness. *In re O'Farrell*, 7 USPQ2d 1673, 1680-81 (Fed. Cir. 1988). A general incentive does not make obvious a particular result, nor does the existence of techniques by which those efforts can be carried out. *In re Deuel*, 34 USPQ2d 1210, 1216 (Fed. Cir. 1995). The “obvious to try” was discussed in the recent *KSR International Co. v. Teleflex Inc.* 550 U.S. \_\_\_, 82 USPQ2d 1385 (2007). However, the various inquiries flowing from this decision with respect to “obvious to try” - choosing from a finite number of

identified, predictable solutions, with a reasonable expectation of success – are still not satisfied by the cited references.

Further, even if the Examiner were to maintain that a *prima facie* case of obviousness has been established, this *prima facie* case must fall in view of the results demonstrated in the Example of the present specification. Specifically, Applicants direct the Examiner's attention to the results set forth in Table 1 on page 13, which is reproduced below:

	Acrylonitrile Used		Polymer Aqueous Solution		Color of Polymer Powder
	Oxazole Concentration [mg/kg]	Hydrogen Cyanide Concentration [mg/kg]	1% Salt Viscosity [mPa·s]	Solubility	
Example 1	≤5	0.7	3600	+	+
Comparative Example 1	10	0.7	3620	–	±
Comparative Example 2	10	5	3550	–	–
Comparative Example 3	≤5	5	3580	–	±

Clearly these data show the criticality of the claimed oxazole and hydrogen cyanide content in the acrylonitrile starting material. In particular, Applicants direct the Examiner's attention to Example 1 and Comparative Example 3, which supports a conclusion of unexpectedness. Specifically, although the only difference between Example 1 and Comparative Example 3 is the concentration of hydrogen cyanide, Example 1 shows improvement in the solubility of polymer aqueous solution and the color of the polymer

powder. Heretofore, it was known that hydrogen cyanide contained in acrylonitrile is a catalytic poison. However, the skilled artisan would not know that the concentration of hydrogen cyanide in acrylonitrile affects the quality of acrylamide polymers. Therefore, the results set forth in Table 1 on page 13 of the specification are unexpected. And, as such, the cited references do not even support a *prima facie* case of obviousness.

In view of the foregoing, withdrawal of this ground of rejection is requested.

Applicants submit that the present application is now in condition for allowance.  
Early notification of such action is earnestly solicited.

Respectfully submitted,

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